



This document is a portion of the *Draft Cruise Ship Discharge Assessment Report (Draft Report)*, published on December 20, 2007. The reference number is EPA 842-R-07-005. The entire *Draft Report* can be accessed at http://www.epa.gov/owow/oceans/cruise_ships/disch_assess.html.

Draft Cruise Ship Discharge Assessment Report

Section 1: Introduction

December, 2007

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1.1 Overview

Cruise ships operate in every ocean worldwide, often in pristine coastal waters and sensitive marine ecosystems. Cruise ship operators provide amenities to their passengers that are similar to those of luxury resort hotels, including pools, hair salons, restaurants, and dry cleaners. As a result, cruise ships have the potential to generate wastes similar in volume and character to those generated by hotels.

The cruise industry is one of world's fastest growing tourism sectors, with the number of cruise ship passengers growing nearly twice as fast as any other travel sector over the last 10 years (CELB, 2003). In addition, average ship size has been increasing at the rate of roughly 90 feet every five years over the past two decades (Bell, 2007). As the cruise industry continues to expand, there is an increasing concern about the impacts cruise ships may have on water quality.

In March 2000, an environmental advocacy group called the Bluewater Network, representing 53 environmental organizations, submitted a petition to the U.S. Environmental Protection Agency (EPA) requesting that EPA identify and take regulatory action on measures to address pollution by cruise ships. Specifically, the petition requested an in-depth assessment of the volumes and characteristics of cruise ship waste streams; analysis of their potential impact on water quality, the marine environment, and human health; examination of existing federal regulations governing cruise ship waste streams; and formulation of recommendations on how to better control and regulate these waste streams. The petition also included specific requests related to sewage, graywater, oily bilge water, solid wastes, and hazardous wastes, as well as monitoring, record-keeping, and reporting. In addition, the petition requested that EPA prepare a report of the requested assessment.

This Draft Cruise Ship Discharge Assessment Report (Draft Report) responds in part to the petition from Bluewater Network. The Draft Report examines five primary cruise ship waste streams—sewage, graywater, oily bilge water, solid waste, and hazardous waste. For each waste stream, the Draft Report discusses (1) what the waste stream is and how much is generated; (2) what laws apply to the waste stream; (3) how the waste stream is managed; (4) potential environmental impacts of the waste stream; and (5) actions by the federal government to address the waste stream.

The most significant new analysis provided in this Draft Report relates to the generation and treatment of sewage and graywater onboard cruise ships. Pursuant to federal legislation entitled “Certain Alaskan Cruise Ship Operations” (33 U.S.C. 1901 Note), EPA has carried out a multi-year project to determine whether revised or additional standards for sewage and graywater discharges from large cruise ships operating in Alaska are warranted under that legislation. Much of the information and data collected for the Alaska effort are summarized in this Draft Report.

There are a number of other waste streams that may be generated onboard cruise ships, some of which may be considered incidental to the normal operation of a vessel (e.g., ballast water, deck runoff, hull coat leachate), as well as air pollution. This Draft Report does not present an assessment of any of these other waste streams. However, as part of a separate effort, EPA has begun an administrative process to prepare for regulation of discharges incidental to the normal operation of a vessel that, as of September 30, 2008, will no longer be excluded from Clean Water Act permitting requirements by virtue of a recent Court decision, which vacated the EPA regulation that had excluded these discharges from those requirements (see 72 FR 34241, June 21, 2007; notice of intent; request for comments and information). In addition, under the Clean Air Act, EPA established emissions standards for nitrous oxides (NO_x) from "Category 3" marine diesel engines, which are very large marine engines used primarily for propulsion power on ocean-going vessels such as container ships, tankers, bulk carriers, and cruise ships (68 FR 9746, 9747, Feb. 28, 2003). EPA promulgated those regulations in 40 CFR Part 94. Recently, EPA solicited public comment on the scope of the rules that EPA should propose for a second tier for Category 3 engines (72 FR 69522, Dec. 7, 2007). Finally, EPA has proposed regulations to establish more stringent standards for particulate matter, NO_x, and hydrocarbons from Category 2 marine engines (72 FR 15938, April 3, 2007).

1.2 Other EPA Cruise Ship Efforts

In addition to developing this Draft Report, EPA has engaged in a number of activities addressing the potential environmental impacts of cruise ships. These efforts are summarized below.

Cruise Ship White Paper, August 2000

This White Paper provided preliminary information regarding cruise ship discharges and waste management practices in response to the petition submitted by the Bluewater Network on March 17, 2000. The White Paper can be accessed at:

www.epa.gov/owow/oceans/cruise_ships/white_paper.pdf

Cruise Ship Public Hearings, September 2000

As part of its effort to gather information on cruise ship discharges and waste management practices, EPA, together with the U.S. Coast Guard and other federal agencies, solicited public input from industry officials, government agencies, environmental groups, and concerned citizens through three regional public information hearings in Los Angeles, CA (September 6, 2000), Juneau, AK (September 8, 2000), and Miami, FL (September 12, 2000). Summaries and transcripts of these public hearings can be accessed at:

www.epa.gov/owow/oceans/cruise_ships/publichearings.html

Cruise Ship Plume Tracking Survey, Summer 2001

EPA conducted a survey to study the dilution of discharges from cruise ships in June 2001. This survey tracked plumes of water and Rhodamine WT dye released through normal wastewater effluent discharge systems in ships operating off the Florida coast to provide information on dilution of cruise ship discharges in offshore waters. This survey also provided preliminary information on whether cruise ship sewage or graywater discharge plumes behave as predicted

by a model developed for Alaska waters. The Cruise Ship Plume Tracking Survey Report can be accessed at: www.epa.gov/owow/oceans/cruise_ships/plumerpt2002/plumereport.pdf

The Cruise Ship Plume Tracking Survey Plan can be accessed at:

www.epa.gov/owow/oceans/cruise_ships/surveyplan.pdf

Cruise Ship Hazardous Waste Tracking System, December 2001

On December 4, 2001, EPA Headquarters urged the Agency's Regions to assign a single tracking number for each cruise ship entering waters of multiple states for purposes of the Resource Conservation and Recovery Act (RCRA). RCRA imposes management requirements on generators, transporters, and other handlers of hazardous waste. Cruise ships regularly use chemicals for operations ranging from routine maintenance to passenger services, such as dry cleaning, beauty parlors, and photography labs. Thus, cruise ships are potentially subject to RCRA requirements to the extent those chemicals result in the generation of hazardous wastes. Under RCRA, each state assigns a hazardous waste tracking number to each cruise ship that enters its waters. However, assignment of tracking numbers by multiple states can result in a single ship having several different tracking numbers for the same waste. Assigning a single tracking number for each cruise ship entering waters of multiple states for purposes of RCRA should result in improved tracking of hazardous wastes generated on cruise ships, increased compliance with RCRA requirements, as well as reduce paperwork for the cruise ships. The EPA memorandum of December 4, 2001, can be accessed at:

www.epa.gov/owow/oceans/cruise_ships/haz_tracking.html

Evaluation of Standards for Sewage and Graywater Discharges from Cruise Ships in Alaska

On December 12, 2000, Congress passed HR 4577, "Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act, 2001," which contained Title XIV, a section called "Certain Alaskan Cruise Ship Operations" (33 U.S.C. 1901 Note) (Title XIV). Title XIV established enforceable discharge standards for sewage and graywater from large cruise ships (those authorized to carry 500 or more passengers for hire) while operating in the Alexander Archipelago and the navigable waters of the United States in the State of Alaska and within the Kachemak Bay National Estuarine Research Reserve. This law authorizes EPA to develop revised and/or additional standards for these discharges in Alaska.

Pursuant to Title XIV, EPA has carried out a multi-year project to determine whether revised and/or additional standards for sewage and graywater discharges from large cruise ships operating in Alaska are warranted under that law. EPA sampled wastewater from four cruise ships that operated in Alaska during the summer of 2004 and 2005. The purpose of this sampling was to characterize graywater and sewage generated onboard and to evaluate the performance of various advanced sewage and graywater treatment systems. EPA also distributed a "Survey Questionnaire to Determine the Effectiveness, Costs, and Impacts of Sewage and Graywater Treatment Devices for Large Cruise Ships Operating in Alaska" to all cruise ships authorized to carry 500 or more passengers for hire that operated in Alaska in 2004. The information collected by the survey includes general vessel information; sources of graywater and sewage; ship-board plumbing systems; data on the effectiveness of sewage and graywater treatment systems in removing pollutants; and costs of these systems.

Using these sampling results, survey responses, and other relevant information, EPA is performing environmental, economic, and engineering analyses to determine whether revised or additional standards in Alaska are warranted under Title XIV. EPA anticipates announcing its determination and making its analyses publicly available in 2008. Much of the information and data collected for EPA's effort under Title XIV are summarized in this Draft Report. More information, including EPA's 2004 and 2005 Alaska cruise ship sampling results, EPA's Generic Sampling and Analysis Plan, and EPA's cruise ship survey questionnaire, can be accessed at: www.epa.gov/owow/oceans/cruise_ships/sewage_gray.html

1.3 Cruise Ship Industry Efforts to Reduce Potential Environmental Impacts

The Cruise Lines International Association (CLIA) was formed in 1975 to promote the benefits of cruising. In 2006, CLIA merged with the International Council of Cruise Lines (ICCL), a sister entity created in 1990 to participate in the regulatory and policy development process on behalf of the cruise industry. According to CLIA, it is now the world's largest cruise association, composed of 24 of the major cruise lines serving North America and representing 97% of the cruise capacity marketed from North America. CLIA operates pursuant to an agreement filed with the Federal Maritime Commission under the Shipping Act of 1984 and serves as a non-governmental consultative organization to the International Maritime Organization.

CLIA members have agreed to adopt mandatory environmental standards for all of their member line cruise ships. Compliance with these standards is a condition of membership in CLIA. All CLIA member cruise ship operators must implement the adopted standards, which address, among others, the following waste streams: graywater and blackwater (sewage) discharges; bilge and oily water residues; incinerator ash; hazardous chemical waste such as photo processing fluid and dry-cleaning chemicals; unused and outdated pharmaceuticals; used batteries; burned out fluorescent and mercury vapor lamps; and glass, cardboard, aluminum and steel cans.

Each CLIA member line operating internationally under the Safety of Life at Sea (SOLAS) Convention (a major international convention dealing with maritime safety that covers a wide range of measures to improve vessel safety including design, construction, and equipment standards) has agreed to integrate these industry standards into its Safety Management System (SMS), which is required by the International Safety Management (ISM) Code (a component of SOLAS). CLIA member lines are thus subject to the internal and external audits mandated by the ISM code. SMS Plans frequently employ the use of third party verification companies (also known as classification societies) such as Det Norske Veritas, Lloyds Register, and American Bureau of Shipping to certify compliance with ISM standards. Oversight for compliance with ISM requirements is carried out through ISM audits by the classification societies and by inspections by the flag states and the U.S. Coast Guard.

For U.S. flagged cruise vessels that are not required to have SOLAS certificates but who are CLIA members (i.e., a small number of very small river cruisers and coastal operators), the U.S. Coast Guard has direct oversight and inspection authority. Further, CLIA member lines falling into this category have included the industry standards in their company safety management system and undertake equivalent auditing measures as well.

In addition, CLIA member cruise lines have committed to these principles (CLIA, 2006):

- Designing, constructing and operating vessels to minimize their impact on the environment;
- Developing improved technologies to exceed current requirements for protection of the environment;
- Implementing a policy goal of zero discharge of MARPOL, Annex V solid waste products (garbage) and equivalent US laws and regulations, by use of more comprehensive waste minimization procedures to significantly reduce shipboard-generated waste;
- Expanding waste reduction strategies to include reuse and recycling to the maximum extent possible, to deposit even smaller quantities of waste products ashore;
- Improving processes and procedures for collection and transfer of hazardous waste; and
- Strengthening comprehensive programs for monitoring and auditing of onboard environmental practices and procedures in accordance with the International Safety Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code).

References

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